

NO DRAWINGS

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(54) A PROCESS FOR MAKING PAPER YARNS

(71) We, COURTAULDS LIMITED, a British Company, of 18, Hanover Square, London, W.1., England, do hereby declare the invention, for which we pray that a Patent may be granted to us, and the method by which it is to be performed, to be particularly described, in and by the following Statement:—

This invention relates to a process for making yarns from paper and to the yarns produced thereby.

Paper yarns have been made by the well-known process of slitting paper into strips and then twisting the strips. Various glues and sizes have been applied to the fibres, the paper or the yarns to facilitate yarn processing or to impart a particular characteristic required by the end use. For example, melamine formaldehyde resins have been added to a paper-making pulp or sprayed onto a paper to form yarns of increased wet strength.

We have now devised a process for making paper yarns of a particular and novel type.

According to this invention a process for making paper yarns comprises print-bonding a paper, slitting the paper along lines parallel to the axis of the paper to form strips and then twisting the strips to form yarns.

Print-bonding is meant to include any process in which a pattern is printed onto the paper so as to create bonded parts of the paper in the form of the pattern. The pattern may be a pattern of adhesive or plasticiser or solvent. Another possibility when the paper contains thermoplastic fibres is to print a pattern of welded areas on to the paper using a patterned heat-welding head. The head may be a heated platen or the head of a high frequency electric welding apparatus.

The patterned nature of the bonding process results in the formation of yarns which are intermittently bonded as distinct

from prior art paper yarns which are bonded throughout, and this can give yarn having a softer handle and capable of forming fabric having a better drape. Also, fancy-effect yarns can be formed. The nature of the characteristics produced by the print-bonding process depends upon the pattern printed. A pattern of bars printed transversely of the paper gives yarns having alternately bonded and unbonded lengths and resembling a slub yarn. Yarns having some of the characteristics of a hetero-yarn may be made by printing longitudinal bars onto the paper and then slitting the paper into strips so that each strip comprises a bonded portion lying along its length and an unbonded portion lying along its length.

Also, the handle and appearance of the yarns depends upon the particular type of print-bonding used. When an adhesive is used the amount of adhesive and its type may be chosen to give various results. Thus, more flexibility is obtained with rubbery latex adhesive than with cured resins.

The paper may be made of the usual wood-pulp fibres or regenerated or synthetic fibres or blends of these. Useful paper-making fibres include those made of regenerated cellulose, in particular flat fibres which have collapsed from a hollow inflated state; cellulose acetate and cellulose triacetate; polyacrylonitrile, including copolymers of acrylonitrile and one or more copolymerisable monomers; modacrylics, for example acrylonitrile/vinylidene chloride copolymers soluble in acetone; polyamides, for example nylon 6, nylon 66 and nylon 610; polyesters, for example polyethylene terephthalate and its crystalline copolymers and polypivalolactone; and polyethylene and polypropylene.

The print-bonded paper may be slot into strips by the usual slitting machines using a row of spaced-apart rotary blades or stationary knives.

The strips are then twisted into yarns and this may be carried out on conventional twisting machinery such as a ring twister.

The invention is illustrated by the following Examples:

EXAMPLE 1

A paper weighing 50 grams per square metre was made from a 50:50 blend by weight of flash-dried kraft wood pulp and 1½ denier, 6 mm. regenerated cellulose staple fibre.

The paper was print-bonded by a screen printing process with transverse bars of a latex of ethyl acrylate containing 20 per cent by weight of solids, thickened with sodium alginate and incorporating a coloured pigment. The bars were 3 mm. in width and were spaced apart by 5 mm.

The print-bonded paper was then dried and cured in an oven at 130°C for 3 minutes.

After curing, the paper was passed through a slitting machine wherein a row of spaced rotary blades slit the paper longitudinally into strips 4 mm. wide. These strips were then collected as yarn on bobbins by a ring twisting machine which inserted 3 turns per centimetre twist.

Example 2

Example 1 was repeated using a paper weighing 50 grams per square metre and made from a 50:50 blend by weight of 1½ denier, 6 mm. regenerated cellulose staple fibre and 6 mm. staple formed from flat, collapsed hollow, regenerated cellulose filaments having a width to thickness ratio of 20:1.

WHAT WE CLAIM IS:--

1. A process for making paper yarns comprising print-bonding a paper, slitting the paper along lines parallel to the longitudinal axis of the paper to form strips and then twisting the strips to form yarns.

2. A process as claimed in Claim 1 in

which an adhesive is printed onto the paper to bond the printed areas.

3. A process as claimed in Claim 1 in which the paper incorporates fibres which are soluble in a solvent or plasticisable by a plasticiser and a solvent or a plasticiser is printed onto the paper to bond the printed areas.

4. A process as claimed in Claim 1 in which the paper incorporates thermoplastic fibres and wherein a pattern of welded areas is printed onto the paper by a patterned heat welding head.

5. A process as claimed in any of Claims 1 to 4 in which the paper is print-bonded in areas comprising a pattern of bars lying transversely of the longitudinal axis of the paper.

6. A process as claimed in any of Claims 1 to 4 in which the paper is print-bonded in areas comprising a pattern of bars lying parallel to the longitudinal axis of the paper and the paper is cut into strips along lines parallel to this axis so that each strip comprises a bonded portion lying along its length and an unbonded portion lying along its length.

7. A process as claimed in any preceding Claim in which the paper comprises flat, regenerated cellulose fibres which have collapsed from a hollow, inflated state.

8. A process for making paper yarns substantially as hereinbefore described in either of the Examples.

9. Paper yarns made by a process as claimed in any preceding Claim.

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